

CLAIMS

What is claimed is:

1. An improved gasket assembly for sealing between longitudinally opposed mating surfaces of at least a pair of members adapted to be forcibly mated together to clamp said gasket therebetween, the mating surfaces having openings therein laterally aligned in longitudinal communication with each other when the members are mated together, said gasket comprising:

at least two relatively rigid carriers each having first and second laterally-extending sides defining a longitudinal thickness therebetween, said carriers each having a gasket opening therethrough adapted to be laterally aligned in longitudinal communication with the openings in the mating surfaces of the members when said gasket assembly is clamped between the mated members;

a longitudinally flexible inner sealing portion of each of said carriers disposed laterally adjacent said gasket opening, said inner sealing portion being longitudinally offset relative to the remainder of said carrier, said inner sealing portion being offset in a longitudinal direction toward a first of the members when said gasket assembly is clamped between the mated members; and

a longitudinally flexible outer stopper portion of each of said carriers spaced laterally away from said gasket opening and disposed laterally outward relative to said inner sealing portion, said flexible stopper portion being longitudinally convex relative to the remainder of said carrier on a side of said flexible stopper oriented in a direction toward said first of the members and being longitudinally concave relative to the remainder of said carrier on an opposite side of said flexible stopper oriented in a

direction toward a second of the members, said flexible stopper flexibly limiting the amount of longitudinal compression of said inner sealing portion and being less flexible than said inner sealing portion, one of said inner sealing portions being thereby maintained in said sealing engagement with the mating surfaces of each of the members during relative movement between the members when the members are mated together.

2. The gasket assembly of claim 1, further including a resilient sealing material substantially more flexible than said carriers and being disposed on at least portions of at least one of said laterally-extending sides of at least one of said carriers oriented in said directions toward the mating surfaces of the members when said gasket assembly is clamped between the mated members.

3. The gasket assembly of claim 2, wherein said inner sealing portions have said resilient sealing material disposed on at least portions of their laterally-extending sides oriented in said directions toward said mating surfaces of the members when said gasket assembly is clamped between the mated members

4 The gasket assembly of claim 1, wherein said inner sealing portions are longitudinally offset to an extent greater than the extent of longitudinal convexity of the respective flexible stopper portions.

5. The gasket assembly of claim 1, wherein each of said inner sealing portions has a lateral dimension greater than the lateral dimension of the respective flexible stoppers.

6. The gasket assembly of claim 2, wherein at least one of said flexible stopper members has said resilient sealing material disposed within and at least partially filling its concave side oriented in said direction toward said second of the members when said gasket assembly is clamped between the mated members.

7. The gasket assembly of claim 2, wherein at least one of said flexible stoppers has said resilient sealing material disposed on at least portions of its laterally-extending sides when said gasket assembly is clamped between the mated members.

8. The gasket assembly of claim 7, wherein each of said flexible stopper members has an additional amount of said resilient sealing material disposed within and at least partially filling its concave side oriented in a direction toward said second of the members.

9. The gasket assembly of claim 1, wherein each of said relatively rigid carriers is a single layer carrier.

10. The gasket assembly of claim 1, wherein at least one of said carriers is formed of a metal-containing material.

11. The gasket assembly of claim 1, wherein at least one of said carriers is formed of a steel-containing material.

12. The gasket assembly of claim 1, wherein at least one of said carriers is formed of a synthetic-containing material.

13. The gasket assembly of claim 2, wherein said resilient sealing material is a rubber-containing material.

14. The gasket assembly of claim 2, wherein said resilient sealing material is an elastomer-containing material.

15. The gasket assembly of claim 2, wherein said resilient sealing material covers substantially all of at least one of said laterally-extending sides of at least one of said carriers.

16. The gasket assembly of claim 2, wherein said resilient sealing material is adjacent at least portions of at least one of said carriers.

17. The gasket assembly of claim 2, wherein said resilient sealing material is screen-printed onto at least portions of at least one of said carriers.

18. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between a cylinder head and a cylinder block of an internal combustion engine.

19. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between a cylinder head and a cylinder block of a gas compressor.

20. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mated flanges of a gaseous fluid-conveying device.

21. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mated flanges of a liquid fluid-conveying device.

22. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mated pipe flanges.

23. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mated manifold flanges.

24. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mating surfaces of members defining an interior of an enclosure for sealingly isolating said enclosure interior from an exterior of said enclosure.

25. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mating surfaces of members that are releasably mated together.

26. The gasket assembly of claim 1, wherein said gasket assembly is adapted to be clamped between mating surfaces of members that are intermittently mated together.

27. The gasket assembly of claim 1, wherein at least portions of at least one of said carriers are separated but interconnected by a portion of said resilient sealing material.

28. The gasket assembly of claim 1, wherein the mating members are components of a fuel cell.

29. The gasket assembly of claim 1, further including a shim disposed between said carriers.

30. The gasket assembly of claim 29, further including a resilient sealing material substantially more flexible than said carriers and being disposed on at least portions of at least one side of said shim.

31. An improved gasket assembly for sealing between longitudinally opposed mating surfaces of at least a pair of members adapted to be forcibly mated together to clamp said gasket therebetween, the mating surfaces having openings therein laterally aligned in longitudinal communication with each other when the members are mated together, said gasket comprising:

at least one relatively rigid carrier having first and second laterally-extending sides defining a longitudinal thickness therebetween, said carrier having a gasket opening therethrough adapted to be laterally aligned in longitudinal communication with the openings in the mating surfaces of the members when said gasket assembly is clamped between the mated members;

a shim disposed adjacent at least one of said laterally-extending sides of said carrier between said carrier and at least one of the members, said shim having a gasket opening therethrough adapted to be laterally aligned in longitudinal communication with said gasket opening through said carrier;

a longitudinally flexible inner sealing portion of said carrier disposed laterally adjacent said gasket opening, said inner sealing portion being longitudinally offset relative to the remainder of said carrier, said inner sealing portion being offset in a

longitudinal direction toward a first of the members when said gasket assembly is clamped between the mated members; and

a longitudinally flexible outer stopper portion of said carrier spaced laterally away from said gasket opening and disposed laterally outward relative to said inner sealing portion, said flexible stopper portion being longitudinally convex relative to the remainder of said carrier on a side of said flexible stopper oriented in a direction toward said first of the members and being longitudinally concave relative to the remainder of said carrier on an opposite side of said flexible stopper oriented in a direction toward a second of the members, said flexible stopper flexibly limiting the amount of longitudinal compression of said inner sealing portion and being less flexible than said inner sealing portion, said inner sealing portion being thereby maintained in said sealing engagement during relative movement between the members when the members are mated together.

32. The gasket assembly of claim 31, further including a resilient sealing material substantially more flexible than said carrier and being disposed on at least portions of at least one side of said shim

33. The gasket assembly of claim 31, further including a resilient sealing material substantially more flexible than said carrier and being disposed on at least portions of at least one of said laterally-extending sides of said carrier oriented in said directions toward the mating surfaces of the members when said gasket assembly is clamped between the mated members.

34. The gasket assembly of claim 32, wherein said inner sealing portions have said resilient sealing material disposed on at least portions of their laterally-extending sides oriented in said directions toward said mating surfaces of the members when said gasket assembly is clamped between the mated members

35. The gasket assembly of claim 31, wherein said inner sealing portion is longitudinally offset to an extent greater than the extent of longitudinal convexity of the respective flexible stopper portion.

36. The gasket assembly of claim 31, wherein said inner sealing portion has a lateral dimension greater than the lateral dimension of the respective flexible stopper.

37. The gasket assembly of claim 32, wherein said flexible stopper member has said resilient sealing material disposed within and at least partially filling its concave side oriented in said direction toward said second of the members when said gasket assembly is clamped between the mated members.

38. The gasket assembly of claim 32, wherein said flexible stopper has said resilient sealing material disposed on at least portions of its laterally-extending sides when said gasket assembly is clamped between the mated members.

39. The gasket assembly of claim 38, wherein said flexible stopper member has an additional amount of said resilient sealing material disposed within and at least partially filling its concave side oriented in a direction toward said second of the members.

40. The gasket assembly of claim 31, wherein said carrier is formed of a metal-containing material.

41. The gasket assembly of claim 31, wherein said carrier is formed of a steel-containing material.

42. The gasket assembly of claim 31, wherein said carrier is formed of a synthetic-containing material.

43. The gasket assembly of claim 32, wherein said resilient sealing material is a rubber-containing material.

44. The gasket assembly of claim 32, wherein said resilient sealing material is an elastomer-containing material.

45. The gasket assembly of claim 32, wherein said resilient sealing material covers substantially all of at least one of said laterally-extending sides of at least one of said carriers.

46. The gasket assembly of claim 32, wherein said resilient sealing material is adjacent at least portions of at least one of said carriers.

47. The gasket assembly of claim 32, wherein said resilient sealing material is screen-printed onto at least portions of at least one of said carriers.

48. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between a cylinder head and a cylinder block of an internal combustion engine.

49. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between a cylinder head and a cylinder block of a gas compressor.

50. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mated flanges of a gaseous fluid-conveying device.

51. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mated flanges of a liquid fluid-conveying device.

52. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mated pipe flanges.

53. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mated manifold flanges.

54. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mating surfaces of members defining an interior of an enclosure for sealingly isolating said enclosure interior from an exterior of said enclosure.

55. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mating surfaces of members that are releasably mated together.

56. The gasket assembly of claim 31, wherein said gasket assembly is adapted to be clamped between mating surfaces of members that are intermittently mated together.

57. The gasket assembly of claim 32, wherein at least portions said carrier is separated but interconnected by a portion of said resilient sealing material.

58. The gasket assembly of claim 31, wherein the mating members are components of a fuel cell.